

## Strategic Issues Related to the Technological Parks in Brazil

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### 1. Introduction

Technological parks have, mainly from the beginning of this decade, acquired growing importance within the Brazilian context, being, eventually, part of the program of the federal government (Pluriannual Plan). As in any other place, Brazilian parks have been considered in the formulation of scientific and technological as well as industrial, urban and regional development policies. They have generated great expectations in several fronts, such as: (1) improving the transfer of information, knowledge and even technology from academic research activities to firms; (2) creating and strengthening micro, small and medium-sized technology-based firms and, promoting, after that, competitiveness gains; (3) generating new job positions; (4) improving entrepreneurial culture and activities, particularly those of more technological contents; (5) promoting a gradual orientation of the Brazilian economy to the knowledge economy. At the macro level, parks should also stimulate regional development, urban revitalization and self-sustainable economic growth and development in all localities where they have been implemented.

The recent initiatives of implementing parks in Brazil have been discussed in diverse fora, receiving, in different degrees, support from several public and private institutions, national and state agencies and even international organizations.

The Ministry of Science and Technology, making use of specific financial resources - Sectoral Funds<sup>4</sup>, managed by the Brazilian Innovation Agency (FINEP) – has supported several initiatives all over the country. Two calls for proposals launched in 2002 aimed at supporting the elaboration of investment plans (feasibility studies) and the implementation of Parks, resulting in 12 approved projects<sup>5</sup>. In 2004, another call for proposals was launched, aiming at supporting investment plans of technological parks, resulting in 11 new projects approved<sup>6</sup>. Additionally, five other projects were supported in 2004-2005 through government procurement. Currently, FINEP has a portfolio of 25 projects of tech parks.

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<sup>4</sup> Sectoral Funds constitute a set of financial funds aiming at to complement, expand and secure the financial resources for supporting the scientific, technological and innovative activities in Brazil. As a result of a very innovative economic engineering, the Sectoral Funds for Supporting Scientific and Technological Development, created from 1999 onwards, are project financing instruments for domestic research, development, and innovation. These Funds have been financially fed from selected productive sectors through the contributions of companies' invoicing and/or from the earnings arising from the exploitation of natural resources belonging to the Federal Government. Currently, there are 16 Sectoral Funds: Petrol & Gas, Energy, Water Resources, Transportation, Mineral Resources, Space Activities, Telecommunications, Informatics, University-Industry Cooperation, Infrastructure, Agribusiness, Biotechnology, Health, Aeronautics, Amazon Region (P&D Development), Water Transportation and Navy Construction. The University-Industry Cooperation Fund is the one which has supported the planning and implementation of Brazilian tech parks.

<sup>5</sup> One of these 12 projects has not been implemented so far.

<sup>6</sup> Two out of these 11 projects have already been contemplated with financial resources from FINEP through the previous calls for proposals in 2002.

Our study, developed during October 2005 - February 2006, undertook, initially, a critical review of the literature. From this review, we learned that analyses and studies of tech parks could be divided into two main blocks. The first block, based on a historical approach, covers the period of 1960s up to the middle of the 1990s and deals with concepts, main stakeholders and their objectives/concerns, and key factors that may contribute for the success of parks (Dorfman, 1983; Currie, 1985; Saxenian, 1985a, b; Muller and Côté, 1987; OECD, 1987; Aydalot and Keeble, 1988; Larsen and Rogers, 1988; Monck et alii (1988), Luger and Goldstein, 1991; Cohen and Simie, 1991; Massey, Quintas and Wield, 1992; Castells and Hall, 1994; Westhead and Storey, 1994).

The second block of the literature, based on a contemporary approach, emerges at the middle of the 1990s (up to now) and assumes a much more analytical pattern in which parks have been questioned about the results they have produced. However, three factors have contributed for making this analytical process a challenge: (1) the lack of measurement indicators; (2) the constraints derived from the lack of more accurate financial information about Parks' investments (both public and private); allied to (3) the excessive political use that has permeated these initiatives. Research in this area has analysed the following aspects of parks: (1) the interaction between university and industry (Vedovello, 1995, 1997, 1998; Bakouros, Mardas and Varsakelis, 2002); (2) the location of firms and their economic performance (Massey, Quintas and Wield, 1992; Lofsten and Lindelof, 2001, 2002, 2003, 2005; MacDonald and Deng, 2004); (3) the origin of firms (Lofsten and Lindelof, 2005); (4) proposals for parks' evaluation (Bigliardi, Dormio, Nosella and Petroni, 2005); (5) parks as an induction tool for driving the process of innovation (MacDonald and Deng, 2004; Hansson, 2004; Hansson, Husted and Vestergaard, 2005); and (6) institutionalization of technological parks within the political system (Phan, Siegel and Wright, 2005).

Taking into consideration the amount of financial resources required for the implementation of parks, it is necessary to evaluate their efficacy and effectiveness for helping the public (and private) decision-making process. The main aims of evaluation processes are to support tech parks in order to induce/guarantee their sustainability over time and to promote policy's adjustment. In the search for an effective support for the formulation of public policy and in line with the international literature and experience, it was carried out a detailed qualitative fieldwork based on case studies of 11 Brazilian parks and projects of parks.

Besides this introduction, the paper is divided in four sections: section 2 – Literature Review – presents the historical and the contemporary approaches of tech parks (subsections 2.1 and 2.2). Section 3 briefly describes the methodology adopted in the research project, followed by section 4 that focuses on the Brazilian tech park experiences. Finally, section 5 concludes the paper.

## **2. The Literature review**

The international literature approaches tech parks as instruments for the integration of several and distinct socio-economic and political agents, such as small, medium and large firms, universities and research institutions and industry, government bodies. In addition, parks have also been considered as privileged *loci* and important players for promoting urban revitalization and local/regional development, stimulating competitiveness and a better entrepreneurial performance, generating economic growth and development.

The discussion about tech parks started at the beginning of the 1960s. In that moment, parks represented a potential tool for supporting and promoting the integration between two worlds:

academe (and its scientific and technological activities) and industry. Roughly speaking, parks aimed at facilitating the transfer of information, knowledge and even technology between these partners (university and industry); creating and strengthening new technology-based small and medium-sized firms, and the firms' competitive gains; and generating new jobs positions.

The literature on technological parks allows us to distinguish two distinct approaches:

(1) The historical approach covers the period of 1960s up to the middle of 1990s and was marked by a kind of simplistic optimism and experimentation, in which analyses, essentially descriptive, delimited the field of study, practices and intervention from an incipient public policy design and institutionalization;

(2) The contemporary approach goes from the middle of 1990s up to now, and pragmatism and scepticism permeate parks initiatives in relation to their effectiveness as a policy tool, taking into consideration track records of their performance. Here, parks have been institutionalized but they have been scrutinized in a more analytical, critical and sceptical pattern. It has been questioned the parks' capacity to promote innovation, entrepreneurship and interaction between university and industry. Additionally, models have been discussed and evaluation and monitoring procedures have been implemented in a more accurate way, exposing how modest parks' results and impacts are.

## **2.1. – Tech parks: the historical approach**

Retrospectively, the origin of the concept of technological parks dates back to the beginning of the 1960s, through the well known spontaneous experiences of spatial agglomeration and technological success of Silicon Valley, California, and Route 128, Boston area, Massachusetts (Saxenian, 1985a; 1985b; Castells & Hall, 1994).

The success of these initial American experiences has, decisively, contributed for the construction of the concept of tech parks and their evolution as a mechanism for integrating universities and industry. The emulation of the American model and its development within the European context happened at the beginning of the 1970s, having as expressive examples the pioneering French (Sophia-Antipolis) and British (Cambridge and Heriott Watt) parks (Castells & Hall, 1994).

The establishment of these first tech parks in developed countries, during the 1970s and more effectively during the 1980s, occurred in a period marked by the lack of economic and industrial vitality (economic crises, unemployment and post-industrial economic scenario). Parks came to this context as a political and institutional answer, linked to experiences and industrial revitalization policy based on spontaneous models, agglomeration concept and geographical proximity as key elements to the systematic promotion of synergies integrating several socio-economic agents and stakeholders involved with the process of innovation: universities, firms, scientists, entrepreneurs, government bodies and later, capitalists (angel, seed e venture).

However, these experiences and policies were implemented on the basis of the prevalent linear model of innovation: transfer of knowledge produced by academic research to the firms' production and commercialization activities.

The public policies sought, on one hand, to insert within the industrial tissue the science and technology components from academe, searching for the strengthening of firms' R&D activities. On the other hand, the policies still sought to establish physical proximity through the agglomeration of universities, research institutions and firms (promoted by parks) as a way of stimulating the interaction among different partners aiming at the establishment of research contracts or development of joint research.

The institutionalization of public policies driven to the implementation of parks and their international expansion over time – United States, Europe and, latter, Asia and Latin America – has produced different experimentation and adaptation that make the concept of parks very flexible when compared to their original meaning.

Currently, it is possible to verify the lack of a comprehensive definition of parks that may be applied to all the initiatives; moreover, there is also a lack of parks' performance indicators. In brief, there is a great heterogeneity of parks' models, making impossible any kind of analysis through a unique format recognized by all. The parks' models variation is in hands with the diversity and local peculiarity, based, for example, on technological and entrepreneurial levels of development and firms' supporting policies.

The institutionalization of tech parks during the 1980s-1990s provoked the emergence of a set of national associations of parks - American, European, British, Brazilian, etc. – each one of them providing its own definition of park and becoming, over time, an additional institutional player (stakeholder).

To illustrate this point, it is interesting to present some definitions that have been adopted in several circumstances. For the United Kingdom Science Park Association (UKSPA, 2006), launched in 1984, a scientific and technological park is:

“a business support and technology transfer initiative that: (a) encourages and supports the start up and incubation of innovation led, high growth, knowledge based business; (b) provides an environment where larger and international businesses can develop specific and close interactions with a particular centre of knowledge creation for their mutual benefit; (c) has a formal and operational links with centres of knowledge creation such as universities, higher education institutes and research organizations”<sup>7</sup>.

On the other hand, the International Association of Science Parks (IASP, 2006), institution also founded in 1984, considers a scientific park as:

“an organization managed by specialized professionals, whose main aim is to increase the wealth of its community by promoting the culture of innovation and the competitiveness of its associated businesses and knowledge-based institutions. To enable these goals to be met, a Science Park stimulates and manages the flow of knowledge and technology amongst universities, R&D institutions, companies and markets; it facilitates the creation and growth of innovation-based companies through incubation and spin-off processes; and provides other value-added services

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<sup>7</sup> UKSPA – [www.ukspa.org.uk](http://www.ukspa.org.uk)

together with high quality space and facilities” (IASP International Board, 6 February 2002)<sup>8</sup>.

Both definitions include knowledge and technology transfer, financial support to the creation of new technology-based firms, space and infrastructure of quality for the promotion of technological development.

The Brazilian Association for the Promotion of Innovative Organizations (ANPROTEC, 2006), founded in 1987, considers a technology park as:

“A complex productive industrial and of services based on scientific and technological artefacts, planned, formal, concentrated and cooperative, that aggregates firms whose production is based on technological research developed by R&D centres linked to the park. It promotes the culture of innovation, competitiveness, the increasing of entrepreneurial capacity, based on the transfer of knowledge and technology, aiming at enriching the production of a given region”<sup>9</sup>.

This definition focuses on the concept of a planned scientific and technological industrial productive complex, incorporating also services, besides the traditional functions of parks such as the strengthening of the university-industry linkages. As a result, the Brazilian parks tend to be planned in a delimited *loci*, in which there are space for housing firms of all dimensions and appropriate infrastructure for “businesses” they intend to house: universities, research institutions, incubatees (young entrepreneurs and the so-called academic-entrepreneurs), financial agents and *venture capitalists*, development agents and authorities linked to the local, regional and national government. The lack of a comprehensive definition of tech parks that could be universally applied does not hinder the identification of important tech parks’ elements. Table 1 below presents the main parks’ stakeholders and their multiple concerns.

**Table 1**  
**Tech Parks – Main stakeholders and their concerns**

Stakeholders	Main concerns
Universities and research institutions	Commercializing academic research results (broadening sources of financial resources for academe and research institutions); broadening academic institutional mission and employment perspectives for researchers and students.
Entrepreneurs and academic-entrepreneurs	Accessing qualified human resources; applying results from academic and research activities in order to optimize the firms’ R&D activities; optimizing financial returns.
Financial agents and venture capitalists	Investing in new technology-based firms (quick economic growth and financial returns).
Government and development agencies	Supporting firms’ innovative activities; Revitalizing deprived economic regions; Generating new jobs positions.

Sources: elaborated by the authors

<sup>8</sup> IASP – [www.iasp.ws/](http://www.iasp.ws/). According to this Association, the expression “Science Park” may be replaced in this definition by expressions “Technology Park”, “Technopole” or “Research Park”.

<sup>9</sup> ANPROTEC – [www.anprotec.org.br](http://www.anprotec.org.br)

Additionally, some key-factors that may contribute to the parks' operational success are described below:

- Appropriate infrastructure for residential and entrepreneurial areas: sanitation, urbanism, transport and telecommunication facilities, offering of value-added services that may attract a set of socio-economic agents (firms, mainly those whose activities are technologically focused, outstanding universities and research institutions);
- Outstanding universities and research institutions already located in the region: responsible for the training of highly qualified human resources (scientists, engineers and technicians); for stimulating the generation, absorption and diffusion of information, knowledge and even technology; for stimulating the interaction between academic and industrial interaction through, among others, research contracts and the development of joint research activities; for fostering the entrepreneurial culture;
- Dynamic and pro-active firms with high commitment to R&D activities: for fostering the creation of new technology-based firms (SMEs); for stimulating the interaction with academic institutions;
- Entrepreneurship: that emerges from a combination of qualification (and quantification) of local human resources, and encompasses special dynamism and pro-activity for accepting technological and behavioural changes;
- Financial resources: from government, through specific programs and its procurement initiatives; and from private sector (firms, banks...) for complementing the public funds;
- Venture capitalists: for stimulating new technology-based firms with highly potential for growth.

Besides these key-factors, it is desirable that tech parks are inserted in a pro-active macroeconomic environment, permeated by political stability and regulatory background favourable to the entrepreneurial activities.

## **2.2 – Tech parks - The contemporary approach**

The contemporary approach of parks, initiated at the middle of the 1990s, assumes a more critical pattern, questioning results and impacts of the initiatives. It also seeks to evaluate results and effective variations emerging from the empirical observation of parks' operation. Among others, this approach uncovers complexities and looks at the future of tech parks. In this context, it is not the case of arguing about the existence, or not, of a comprehensive concept of tech parks – it does not exist, for sure. Independently of the concept put into practice, stakeholders and their objectives/concerns have been unchangeable over time and space: (1) generation of jobs; (2) establishment of new technology-based firms; (3) strengthening the interaction between university and on-parks firms, and (4) diffusion of new technologies.

The contemporary approach results from the following: (1) consolidation of the tech park movement in both developed and developing countries, with lasting experiences, allied to the lack of performance indicators that may validate their diverse socio-economic and political impacts; (2) concrete perception that these initiatives presuppose considerable amount of

financial resources – public and private – independently, or not, of performance evidence; and (3) excessive political use that these initiatives engender.

In relation to the lack of performance indicators that may validate the several tech parks' impacts, it is consensual the existence of implicit methodological difficulties in the evaluation procedures. These difficulties are enormous, particularly when the focus of analyses lay down on the “intangible domain” about the interaction between researchers and entrepreneurs (university and firms/industry) – and the results emerging from these interactions -, on the generation and diffusion of knowledge and the synergies established among the several economic agents involved in this process.

Researchers have concentrated their analyses on the following aspects:

- **University-Industry interaction** – Taking into account particular experiences, this line of research seeks to evaluate the nature and frequency of links established between on-park firms and the host university (and its researchers), as well as on the results and benefits that emerge from these linkages for the partners. Additionally, it tries to evaluate the importance of the physical proximity between partners (on-park firms and researchers) as a driving force for strengthening the university-industry links. As a conclusion, these studies show that the linkages established between on-park firms and host universities are very important, but quite modest, mainly when formal links (R&D focus) are on stage. Moreover, the physical proximity between partners has not been determinant for the strengthening of linkages (Vedovello, 1995, 1997, 1998; Bakouros, Mardas & Varsakelis, 2002).
- **Location of firms and their economic performance** – Other line of research compares the economic performance of on-park firms and similar ones, but off-park located. From particular experiences, we learn that these two groups of firms present a similar performance (Massey, Quintas and Wield, 1992). Some aspects may differ when both groups are analysed: for example, the generation of jobs and turnover (sales) give advantage for on-park firms; on the other hand, profits are higher for off-park firms (Löfsten and Lindelöf 2002, 2003, 2005). Moreover, some studies state that economic performance of off-park firms is always in advance (MacDonald and Deng, 2004).
- **Origin of firms** – Other studies compare similar on- and off-park firms, from the point of view of firms' performance according to their origin: spin-offs (from academe) or corporate. In this context, analysis of Swedish parks (Löfsten and Lindelöf, 2005) shows that both groups of firms present a similar economic performance. In other words, parks do not constitute an advantage neither in terms of strengthening R&D networks and innovative activities, nor the strengthening of the interaction between university and industry.
- **Parks' evaluation proposals** – This line of research focuses on models for evaluating the performance of tech parks, based on some aspects such as: parks' mission and strategy; environment and context in which parks are inserted in; stakeholders' commitment; life-cycle (maturity) of parks; scientific and technological expertise; and legal aspects. This line of research, proposed by the Italian experience (Bigliardi et al, 2005), prioritizes the evaluation of parks considering their own development strategies, particularly their mission (differently from the conventional proposals based on the evaluation of on-park firms). To the usual kaleidoscope of parks' stakeholders, this model of evaluation of parks is relevant

for making clear the different stakeholders' objectives/concerns and stakeholders' level of commitment.

- **Parks as an induction tool for driving the process of innovation** – Without taking into account particular experiences, some studies such as those developed by MacDonald and Deng (2004) present a literature review on tech parks and point out some contradictions on parks' models. Two main aspects emerge from this kind of analysis: (1) the perception of innovation model as being linear, manageable and controllable, and (2) the connectivity of parks' models to the linear model of innovation that does not represent the contemporary view of the innovation process. Additionally, Danish authors (Hansson, 2004; Hansson, Husted and Vertergaard, 2005), analysing the knowledge generation and diffusion, point out to the strength of parks in creating innovative firms, but not in creating an innovative environment based on learning process. In a nutshell, it seems that parks are constituted in a pro-active environment for the commercialisation of technologies, but not necessarily for the production of technologies that can be commercialised.
- **Institutionalization of tech parks within the political system** – Finally, some authors (Phan, Siegel and Wright, 2005) go through the insertion of tech parks within the institutional political system. Here, parks have been considered as tools for the economic development and political bargain in two levels: (1) internally to the institutions (recognition, networks, and services) and (2) externally, as providers of resources (government, firms, market). The main conclusion that emerges from this line of research is that parks are not market-force orientated, but a combination of political objectives that control the distribution of public funds. In this context, the main issue is not if, in fact, parks increase start-ups higher rates of success, but on the contrary, if they confer legitimacy to the objectives that politically support and feed them.

In spite of the methodological difficulties already mentioned, the current literature and its diverse lines of analyses seek to show the path that has been followed in order to identify the impacts tech parks have provoked within the localities and regions in which they have been implemented. It is not the case of, simply, to check aims and objectives *versus* reality, but seeking sustainable bases for parks as a public policy tool.

### 3. Methodology

In line with the international literature and experience, a detailed field work was undertaken, based on a set of 11 projects of Brazilian tech parks that have been financially supported by the federal government, through the Ministry of Science and Technology and its financial arm, the Brazilian Innovation Agency (FINEP). Given the incipient development stage of most of these projects, the results supporting this work are mainly qualitative. The list of tech parks and projects of parks, presented below, shows the concentration of initiatives in both South and Southeast regions of Brazil<sup>10</sup>:

#### First public call for proposals 2002

##### *Investment plans (feasibility studies):*

- Parque Tecnológico de Belo Horizonte (MG)

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<sup>10</sup> Even keeping the concentration of parks and projects of parks in the South and Southeast regions of Brazil, the public call for proposals in 2004 and those supported through the government procurement (2004 and 2005) also benefit other Brazilian regions.



- Porto Digital (PE)
- Sapiens Park (SC)
- Parque Tecnológico em Campinas (Campinas, SP)

***Implementation support:***

- Parque Tecnológico de São Paulo (SP)
- Parque Tecnológico do Rio de Janeiro (RJ)

**Second public call for proposals 2002**

***Investment plans (feasibility studies)***

- Parque de Inovação Tecnológica e Cultural da Gávea (RJ)
- Centro de Apoio ao Desenvolvimento Científico e Tecnológico da Universidade de Brasília (DF) (financial resources not delivered)

***Implementation support:***

- Parque de Alta Tecnologia de São Carlos (São Carlos, SP)
- Parque Tecnológico da PUC/RS (RS)
- Tecnoparque Curitiba (PR)
- Parque Tecnológico Regional de Londrina (Londrina, PR)

A case study protocol was developed, so that the case studies would have equivalent interviewing conduction and construction pattern (Yin, 2005). The necessary information and material for our analyses were collected through personal interviews with the management team of parks/projects of parks in which we applied a pre-defined questionnaire. Additionally, we made use of technical visits and secondary documentation.

**4. Technological parks in Brazil**

The movement of tech parks in Brazil is quite young, having started its first projects in a more organized pattern at the beginning of this decade. Since 2002, tech parks have been considered in the formulation of scientific and technological as well as industrial policies. The federal government, through the Ministry of Science and Technology (MCT) and, particularly, the Brazilian Innovation Agency (FINEP), have supported several initiatives spread all over the country, most of them still in an initial phase of development. This means that the analyses carried out in this research is strongly qualitative.

Looking at the sample of 11 Brazilian technological parks investigated in this research in the light of the international experience and literature, some interesting aspects emerge:

1. The movement of technological parks in Brazil is still very young, but has, over the recent years, conquered space within the political agenda, in particular that of linked to the science and technology and industrial environments.
2. In both the international and the Brazilian contexts, there is no concept of tech park of universal and comprehensive application. As mentioned before, this concept does not exist as a matter of fact. Also, there is no Brazilian model of tech park: the experiences observed – most of them in an initial phase of development, and quite ambitious – are very diverse from one another, assuming the most different hues and shades of colours.
3. Independently of the adopted concept for parks, the main stakeholders involved with these initiatives and their set of objectives (and concerns) remain unchangeable over time. These objectives may be grouped into four general headings, as follows: (1) generation of new jobs;

(2) establishment of new technology-based firms; (3) strengthening of the interaction between universities and on-park firms; and (4) promotion and diffusion of new technologies. In the Brazilian context, the stakeholders and a similar broad set of objectives are also on stage. However, it is remarkable that in most of the Brazilian cases there is no adherence between projects of parks and the local reality. The identification of parks' priorities shows itself highly ambitious very often and, again, not adherent to strategic plans that may allow them to become a reality. This situation suggests (indicates) the need of restructuring parks' design and implementation. In addition, there are challenges in terms of public policy decision-making process: what adjustments are necessary for transforming the Brazilian tech parks more adherent to the local reality and how to drive the necessary changes in a context in which the political use is quite excessive and the level of stakeholders' commitment is so fragile.

4. In general, it has been identified the lack of parks' performance indicators able of validating the diverse impacts that emerge from their implementation. In the Brazilian context, the initial phase of development of most of these projects allied to the lack of more mature (national) experiences make a challenge more concrete and focused analyses. This is the reason why it is extremely important, in the Brazilian context, to make an extra effort in order to implement performance indicators as quickly as possible within the agenda of all the stakeholders involved with parks, in particular project managers and financial agencies.

5. Independently of parks' performance and evidence, tech parks require a huge amount of public and private investments for their planning, implementation and operation. In the Brazilian case, the lack of financial engineering strategies that may drive the initiatives to their self-sustainability is critical, creating an undesirable and unaffordable dependence on public financial resources. Projects' self-sustainability is essential.

6. In general, but particularly in Brazil, parks have been strongly designed in terms of physical infrastructure for supporting firms and other partners. More intangible aspects, of crucial importance for the innovation process – strengthening of the university-industry interaction, generation of new technology-based firms, entrepreneurial culture – have been neglected. The contemporary context, strongly based on information, knowledge, and technology and institutional ruptures that transform time and space through new organizational arrangements, calls for a different approach of parks. In the Brazilian context, more concern on intangible assets could bring vitality to the movement of parks, broadening their possibilities of success in the long-run.

## 5. Conclusion

This work sought to critically evaluate how tech parks have evolving over time (and space), on the basis of a detailed review of the literature. It was identified the lack of a comprehensive definition of park as well as of performance indicators that could validate them (results and impacts) as a public policy tool. Additionally, the historical approach of parks, from optimism in relation to parks' results and impacts, gave raise, gradually, to the contemporary view based on a more sceptical and uncertain scenario. This contemporary approach questions the parks' capacity in dealing with (1) maturity and long-run development; (2) high costs *versus* fragile financial engineering and strategy and (3) difficulties in reconcile stakeholders' multiple objectives and concerns.

For the Brazilian context, these aspects are quite relevant since Brazilian tech parks have been implemented without the necessary adherence between parks' projects and the local

reality, besides being highly ambitious but lacking strategic plans that may allow them to become a reality. Parks' restructuring is desirable. However, the excessive political use that surrounds these projects should be reduced at the same time that stakeholders' commitment should increase substantially.

Public policy agents should make an extra effort in order to intervene in the process of designing, implementing and operating tech parks as a way of provoking the necessary adjustments to the reality in which parks will operate.

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